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Central Intelligence Agency

Washington, D.C. 20505

DIRECTORATE OF INTELLIGENCE

9 March 1983

# China: Commitment to Nuclear Power

## Summary

*China in 1983 appears committed to the development of a nuclear power industry. Last year's internal debate seems to have subsided, except for occasional interministerial bickering. China is now pushing to complete two nuclear plants by the end of the decade -- a 300-megawatt plant to be built near Shanghai in Zhejiang Province, using mostly domestic resources, and an 1800-megawatt plant that Guangdong Province plans to import in a joint venture with China Light and Power (CLP), a Hong Kong utility.* 25X1

*China will be lucky to finish either plant on time. The Shanghai plant has design problems, and the joint venture for the Guangdong plant faces a raft of partnership disagreements as well as financing and vendor problems; the Chinese may have to import the Guangdong plant on their own or abandon it altogether. Despite the difficulties, China has actively pursued a wide range of international contacts and negotiations aimed at acquiring nuclear equipment and cooperation for these projects.* 25X1

*The French and West Germans are the frontrunners for nuclear sales to China, but the PRC would prefer to buy US technology for both plants. Beijing lately appears eager to reassure the United States that China intends to behave responsibly as a nuclear supplier state. Before awarding any contracts for their nuclear power projects, the Chinese may try to iron out their differences with the United States and work toward the bilateral nuclear cooperation agreement the US requires for a sale.* 25X1



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*This memorandum was prepared by* [redacted] *of the China Division of the Office of East Asian Analysis. Questions and comments are welcome and may be addressed to the author* [redacted] 25X1 25X1

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## The Rationale for Nuclear Power

China's decision to develop nuclear power stems primarily from its need to create energy options for the long run. The acquisition of state-of-the-art nuclear technology from abroad and the hands-on experience in Shanghai and Guangdong would constitute a major step in this direction. The experience with these two pilot projects will provide a basis for determining whether nuclear power is economically and technologically feasible for China. In this connection the Chinese will also have to weigh how much foreign participation in the industry would be required in the future. 25X1

The two plants will add only slightly to China's overall output of power. Even with an expanded nuclear program through the 1990s (the Chinese have talked about as many as six plants), nuclear power will not add more than 5 or 10 percent to China's power generation capabilities, in a time-frame when planners talk about quadrupling overall economic output. Still, nuclear plants can supplement traditional power sources in shortage-prone, heavily-polluted areas like Shanghai and avoid unnecessary idling of factories. 25X1

## The Shanghai Plant

The Chinese plan to build the 300-megawatt plant in Zhejiang Province, near Shanghai, drawing primarily on their own resources. A domestically-constructed plant was envisioned as early as 1970 but no real progress had been made by end of the decade. In the late 1970s China negotiated to purchase an 1800-megawatt plant from Framatome, a French company and a licensee of Westinghouse nuclear technology. The Chinese signed a nuclear cooperation treaty with the French in 1979 in preparation for the sale, but cutbacks in the Chinese economy led to cancellation of this deal. At the time of cancellation the deal had already received COCOM approval and the Chinese were showing interest in joining the International Atomic Energy Agency (IAEA). 25X1

As an alternative to an imported plant, the Chinese stepped up their efforts to design and construct a smaller plant to be built largely from domestic resources. The 300-megawatt size they chose is too small to be practical in the West, but for the Chinese its construction appears feasible and would provide hands-on experience difficult to acquire otherwise. 25X1

The Ministry of Nuclear Industry apparently has begun site preparation of the Shanghai plant, and hopes for a ground-breaking in the first quarter of this year. The plant has been incorporated into China's 6th Five-Year Plan (1981-1985). Commercial operation is tentatively scheduled for 1988, but design problems have already occurred. The Chinese, who designed the plant in two parts, have completed the reactor plans but are experiencing problems with the power plant design. Western businessmen say the Chinese failed to understand all of the



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problems involved in separating the design components. Each half was assigned to a different engineering company and coordination has been inadequate. 25X1

Despite design problems, the Chinese have gained confidence in their manufacturing capabilities, and are trying to keep foreign participation in the Shanghai project to a minimum. The Chinese initially expected to import both the coolant pumps and turbogenerators but have since arranged a co-production agreement with Westinghouse for turbogenerators in the 300-megawatt range. They now plan to use Chinese-built turbines of US design at Shanghai. 25X1

International competition to supply equipment for the Shanghai plant is fierce. Westinghouse is currently seeking an export license for both coolant and centrifugal charging pumps for Shanghai; the West Germans, however, had filed last October for COCOM approval to sell coolant pumps. 25X1

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As for the French, Beijing signed a new nuclear cooperation agreement with them in 1982, specifying French participation in the 300-megawatt Shanghai plant. So far the Chinese do not appear to be negotiating with the French to supply any equipment for Shanghai. The West Germans may have an edge in making any sales for Shanghai, but at this point nothing is certain. 25X1

The Chinese hope to use US engineering expertise to troubleshoot their designs for the power plant and reactor at Shanghai. Several US firms have been invited to submit bids for consulting work. The Chinese claim that such work is not subject to US export restrictions, but according to the Commerce Department, contracts of this nature appear to violate the 1954 Atomic Energy Act. The inability of the Chinese to use the US engineering expertise they seek may delay the progress of the plant. 25X1

## The Guangdong Plant

After more than a year of leadership indecision on whether to build a nuclear power plant in Guangdong, NCNA announced on 23 December that the State Council had given final approval for the project. Unlike Shanghai, this plant will be heavily dependent on foreign participation, virtually a whole-plant import by a joint venture involving Guangdong Province and the Hong Kong utility, China Light and Power (CLP). The Bank of China has promised Guangdong a total of 6 billion yuan and US $300 million in foreign exchange for 1983 to begin site construction of the nuclear plant and other related projects. Despite these green lights, the future of the plant remains in serious doubt. 25X1

Higher prices and interest rates now jeopardize the plant's profitability. Framatome, the French nuclear supplier, believes China now has no other practical source for a nuclear plant


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import for the Guangdong Project, and has reportedly raised its price by as much as 50 percent. The interest rates offered by the French export-import bank to finance the project have risen from 7.5 percent in 1980 to 11 percent in current negotiations; these rates are beyond Framatome's control. The combination of higher costs and interest rates may make the plant unprofitable. China might be willing to accept financial losses in order to gain firsthand experience with a nuclear plant of this size, but profits will determine CLP's participation and the fate of the joint venture.

Joint Venture Problems

No formal partnership agreement has yet been agreed to between Guangdong Province and CLP. The feasibility study worked up for the plant two years ago assumed that Guangdong Province would cover 60 percent of the equity and loans, and CLP 40 percent. The division of costs would also determine each partner's share of the power generated by the plant. Guangdong intended to repay its loans by selling about half its share of the plant's power to Hong Kong. Thus Hong Kong would receive about three fourths of the Guangdong Plant's power, supplied by both partners in the joint venture. Guangdong Province itself would only receive 25-30 percent.

As the two partners moved to pin down the details of this agreement, differences arose. In the last few months, CLP has demanded responsibility for management of the plant during its first ten years of operation, while seeking to reduce its own share of financial responsibility in the project. Originally CLP was to represent a consortium of private investors who would finance CLP's 40 percent share of the costs. CLP, unable to line up investors, has reduced its intended liability to as little as 1 percent, while claiming the Hong Kong government will finance as much as 19%.

Complicating the situation is the fact that neither partner is guaranteed the Hong Kong market they need to repay loans and make a profit. The Hong Kong government is only willing to buy power from the joint venture if the cost is no more than from other available current sources. Quantities have not been specified.

The most recent statements by Lord Kadoorie, Chairman of China Light and Power, seem to hedge further on CLP's commitments to the Guangdong nuclear power plant. Kadoorie, who has always been a strong supporter of the plant, downplayed the NCNA 23 December announcement of official approval, telling US officials in January that any CLP decision to go ahead with the plant was probably 12 to 18 months away.

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At present, CLP is reassessing the plant's profit potential while striving for a workable operating agreement with Guangdong Province. We believe CLP is unrealistic in its demand for management of the plant, given its expressed wish for reduced financial responsibility, and has yet to show that the Hong Kong government will help finance the plant. Investment and output shares may have to be reworked entirely.

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Should the current talks between Guangdong and CLP fail, it is conceivable that the Chinese may try to shoulder the costs of the plant alone rather than abandon the project. China is currently flush with foreign exchange and could easily obtain a supplier credit for the plant. Going forward with Guangdong would not only give the Chinese more flexibility in meeting their energy needs, but also demonstrate their commitment to maintain economic growth in Hong Kong as 1997 approaches.

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Competing for the Chinese Nuclear Market

In recent months Beijing has stepped up its efforts to develop ties with foreign governments and manufacturers in the field of nuclear technology. The purposes are threefold: to counter France's negotiating strength in dealing for the Guangdong plant; to secure engineering consultants to review Chinese-made designs and plans for the Shanghai project, and perhaps Guangdong; and to expand China's international contacts for nuclear technology and assistance.

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Although the French at this time are China's only practical source for the Guangdong power plant, the Chinese have maintained or initiated negotiations with the Japanese, Americans, British, and Swedes regarding nuclear plant sales.

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by pursuing these negotiations they can bring the French down on price.

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the French are unlikely to lower their price much unless they believe a US bid is a real possibility.

The Chinese have moved aggressively in other areas of nuclear energy development as well. US engineering firms have been invited to bid on the engineering review contracts for both Shanghai and Guangdong. Beijing is also moving forward with its nuclear cooperation and purchases of fuel reprocessing equipment from Italy, and nuclear safety exchanges with the United States and Japan.

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Over the past few months the Chinese have made greater efforts to reassure Washington that Beijing intends to use nuclear technology responsibly. Chinese ministry-level officials



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have offered to provide to US businessmen and government officials a variety of assurances that any sale of US technology for China's nuclear power development would be used strictly for its intended peaceful purposes. Although none of the offers are sufficient to meet US concerns over non-proliferation, they show increasing Chinese flexibility on the nuclear issue and tend to confirm Chinese preferences for US technology. [redacted] 25X1

Also indicative of China's intentions is last month's visit by a Chinese diplomat to the International Atomic Energy Agency in Vienna. The official reportedly expressed Beijing's interest in membership. No date of application was specified or implied. Although the United States wants China to place its exports of nuclear materials under IAEA safeguards, IAEA membership itself would not be mandatory before licensing US nuclear exports to the PRC. Beijing's interest in the IAEA may signal their willingness to negotiate seriously for bilateral agreement with the United States, or may be offered up as a tacit counterproposal in place of other non-proliferation statements also required by the United States. [redacted] 25X1

Implications for US Firms

China may prove to be a substantial market for sales of nuclear equipment by Western firms, although its potential is probably overestimated by vendors. Most future negotiations by the Chinese are likely to cover sales of pumps or other components for domestically built plants, and for engineering consultant contracts. Even if all goes well for an imported plant at Guangdong, the Chinese are only likely to import at most one or two additional complete plants. If the Chinese abandon Guangdong or import the plant on their own, Beijing may forgo subsequent whole-plant imports altogether. [redacted] 25X1

US firms are still very much in the running to supply equipment for China's nuclear power program. The Chinese appear anxious to award a contract for Guangdong, but may seek a bilateral nuclear cooperation agreement with the United States before choosing a vendor. Furthermore, as China has become more committed to its nuclear power program, its preference (as well as CLP's) for dealing directly with US firms instead of licensees like Framatome has become more clear. The Chinese are probably willing to wait for US technology if its eventual provision appears likely. [redacted] 25X1

If US firms do not participate in the Shanghai or Guangdong projects, they will still have a chance to compete for future contracts. Given the common technology used by French and US suppliers, vendors from both countries will be offering technology familiar to the Chinese in competing for future sales of plants or equipment. [redacted] 25X1


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